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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/539,218	06/17/2005	Richard R Roesler	PO7632US/MD02-174B	4534

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BAYER MATERIAL SCIENCE LLC  
100 BAYER ROAD  
PITTSBURGH, PA 15205

EXAMINER
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ZIMMER, MARC S

ART UNIT	PAPER NUMBER
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1712

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	04/03/2007	PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

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<b>Office Action Summary</b>	<b>Application No.</b> 10/539,218	<b>Applicant(s)</b> ROESLER ET AL.	
	<b>Examiner</b> Marc S. Zimmer	<b>Art Unit</b> 1712	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 17 June 2005.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-15 is/are rejected.
- 7) ☒ Claim(s) 16-20 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |                                                                                                                                   |                                                                                         |
|-----------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)                                                       | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                              | 5) <input type="checkbox"/> Notice of Informal Patent Application                       |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)<br>Paper No(s)/Mail Date <u>06/17/05</u> . | 6) <input type="checkbox"/> Other: _____                                                |

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Emmerling et al., U.S. patent # 5,554,709 in view of Schmalsteig et al., U.S. Patent # 5,756,751, and Higuchi et al., U.S. patent # 5,124,425.

Emmerling et al. disclose a silane-functionalized polyurethane for use in a number of application including sealant formulations (column 1, lines 21-24). The polymer is made by employing either of the approaches outlined in column 2, lines 11-51.

The first strategy entails reacting a hydroxyl group-terminated polyol with a diisocyanate thereby providing a telechelic isocyanate-terminated polyurethane prepolymer that, in a subsequent step, is reacted with a quantity of monofunctional alcohol or monoalkyl polyether alcohol that ensures that at least 1, but less than two, isocyanate groups on average that are contributed by the polyurethane prepolymer remain unreacted. In alternative chemical parlance, the mono-ol is added in a molar ratio of up to 1:2 relative to the number of moles of isocyanate group. Finally, a silane adhering to the structural conditions delineated in column 2, lines 30-51 is reacted with the mixture of isocyanate-functionalized urethane prepolymers obtained in the second step to provide a mixture of polyurethanes that, by virtue of the preliminary reaction

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between the isocyanate and the monohydric alcohol, will contain both polyurethanes having two alkoxy silane endgroups and polyurethanes having one alkoxy silane endgroup. The relative amount of the polymer having one alkoxy silane endgroup is dictated by the amount of isocyanate groups that are blocked by way of reaction with the mono-ol. Where fully 50 mol% of the isocyanate groups on the polyurethane prepolymer have been reacted with mono-ol, there will be an equal number of polymer chains that are mono- and disilylated. However, any number of isocyanate groups from greater than zero to 50 mol% may be blocked.

Applicant uses yet another expression to define the relative amounts of the polyol and mono-ol: wt.% of the latter as a percentage of the weight of the former. In Example 1, the mono-ol is added in an amount corresponding to 14.7 wt. % of the polyol.

As an aside, it is appreciated that, whereas Applicant claims a process wherein the polyol and the mono-ol are reacted with the polyisocyanate simultaneously, they are reacted sequentially in the reference. It is, nevertheless, the position of the Examiner that a modification of the prior art process such that the mono-ol and polyol are reacted concomitantly with the diisocyanate would have been obvious to one of ordinary skill. *In re Burhans*, 154 F.2d 690, 69 USPQ 330 (CCPA 1946) (selection of any order of performing process steps is prima facie obvious in the absence of new or unexpected results); see also *In re Gibson*, 39 F.2d 975, 5 USPQ 230 (CCPA 1930) (Selection of any order of mixing ingredients is prima facie obvious.).

The second approach mentioned in column 2 is one wherein a hydroxyl group-terminated polyether polyol is reacted with a mixture of mono- and diisocyanate after

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which the aforementioned silane is reacted with the mixture of urethane polymers bearing one or two terminal isocyanate groups to provide, again, a mixture of polyurethanes having two alkoxysilane endgroups and polyurethanes having one alkoxysilane endgroup. The mono and diisocyanate compounds are not expected to differ widely in their molecular weight and, hence, the limitations of claims 7-9 and 13-15 will be inherently satisfied since the ratio molar ratio of monoisocyanate to diisocyanate is >0-1:1 (column 4, lines 43-57).

The molecular weights of the polyols and mono-ols advocated by the reference are 500-4000 and 1000-2000 respectively according to column 3, lines 39-41 and column 4, lines 35-36.

There are two limitations that remain unsatisfied by Emmerling. The first is Applicant's limitation that the polyether that is employed should have a degree of unsaturation of less than 0.04 meq/g. Higuchi et al., like Emmerling, describe the preparation of polyurethane-ether copolymers for use as sealants. Higuchi recommends using polyethers derived from reactions wherein a double metal cyanide complex is used as the catalyst that possess unsaturation content of less than 0.07 meq/g for the reason that the polyurethanes obtained therefrom exhibit enhanced flexibility and comparatively high elongation. See the abstract, Background section, and the first three paragraphs of the Disclosure of the Invention section. It, therefore, would have been obvious to one of ordinary skill at the time of invention to use polyether polyols having a low degree of unsaturation in the invention described by Emmerling. (It may, in fact, be the case that the polyols used by Emmerling do satisfy this limitation but

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the reference is silent concerning that polymer attribute. Certainly, the matter of minimizing unsaturated group content has been an intense area of investigation in the prior art. Allen et al., U.S. patent # 5,670,601 is one of numerous references that devotes a considerable amount of text to summarizing other attempts to reduce the degree of unsaturation in polyethers that are subsequently employed in the preparation of polyurethanes.)

Emmerling fails to anticipate the present claims also for the reason that the amino-functional silane described therein does not satisfy the structural limitations of the silane (c) disclosed in claim 1 (and, by extension, the cyclization step to a cyclic urea/reactive silane group). Schmalstieg et al. says that the amino-functional silanes that have been employed in the prior art to produce silylated polyurethane are disadvantageous in that the products yielded therefrom are inhomogeneous and exceedingly viscous (column 1, lines 52-56). As an alternative to the more conventional amino-functional silanes, such as aminopropyltri(m)ethoxysilane, they recommend using a silane (III) that is identical to component (c) of the claimed invention. It is further contemplated that, upon reacting the silane bearing an aspartate moiety with the isocyanate-terminated polyurethane, cyclization of the aspartate to provide a hydantoin residue be promoted by heating to 100-140° optionally in the presence of a catalyst (see formula (I) in column 2 and column 7, line 45 through column 8, line 3).

***Allowable Subject Matter***

Claims 16-20 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. The molecular weights required of the polyether components recited in these claims is substantially higher than are the molecular weights of the corresponding materials in the *Emmerling et al.* There was no clear motivation to modifying the teachings of *Emmerling et al.* in the manner necessary to satisfy all of the limitations of these claims.

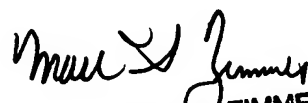
Any inquiry concerning this communication or earlier communications from the examiner should be directed to Marc S. Zimmer whose telephone number is 571-272-1096. The examiner can normally be reached on Monday-Friday 8:00-4:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Randy Gulakowski can be reached on 571-272-1302. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

March 30, 2007

  
MARCO S. ZIMMER  
PRIMARY EXAMINER